App. No. 10/708,663
Amendment dated April 04, 2005
Reply to Office action of January 4, 2005

Amendments to the Specification (other than claims):

Please replace paragraph [0047] with the following amended paragraph:

[0047] The obtained sintered part is subjected to processing according to requirements. In cases where a conductive paste is to be screen-printed onto the sintered part in the ensuing manufacturing steps, the surface roughness is preferably [[5 □m]] 5 μm or less in Ra. If over [[5 □m]] 5 μm, in screen printing to form a circuit on the compact, defects such as blotting or pinholes in the pattern are liable to arise. More suitable is a surface roughness of [[1 □m]] 1 μm or less in Ra.

Please replace paragraph [0053] with the following amended paragraph:

[0053] These powders are mixed together, and by adding a binder and a solvent to the mixture a paste is prepared; predetermined circuit patterns are formed with the paste by screen printing. In doing so, the thickness of the conductive paste is preferably [[5 □m]] 5 μm or more and [[100 □m]] 100 μm or less in terms of its post-drying thickness. If the thickness is less than [[5 □m]] 5 μm the electrical resistance would be too high and the bonding strength would decline. Likewise, if in excess of [[100 □m]] 100 μm the bonding strength would be compromised in that case as well.

Please replace paragraph [0059] with the following amended paragraph:

[0059] In that case, the amount of sintering aid added preferably is 0.01 wt. % or more. With an amount less than 0.01 wt. % the insulative coating does not densify, making it difficult to secure electrical isolation of the metal layer. It is further preferable that the amount of sintering aid not exceed 20 wt. %. Surpassing 20 wt. % leads to excess sintering aid invading the metal layer, which can end up altering the metal-layer electrical resistance. Although not particularly limited, the spreading

thickness preferably is [[5 □m]] 5 μm or more. This is because securing electrical isolation proves to be problematic at less than [[5 □m]] 5 μm.

Please replace paragraph [0060] with the following amended paragraph:

[0060] Next, in the present method, the ceramic as substrates furthermore can be laminated according to requirements. Lamination may be done via a bonding agent. The bonding agent—being a compound of Group IIa or Group IIIa elements, and a binder and solvent, added to an aluminum oxide powder or aluminum nitride powder and made into a paste—is spread onto the bonding surface by a technique such as screen printing. The thickness of the applied bonding agent is not particularly restricted, but preferably is [[5 □m]] 5 μm or more. Bonding defects such as pinholes and bonding irregularities are liable to arise in the bonding layer with thicknesses of less than [[5 □m]] 5 μm.

Please replace paragraph [0070] with the following amended paragraph:

[0070] A further preferable condition is that the surface roughness of the wafer-carrying side be [[5 □m]] 5 μm in Ra. If the roughness is over [[5 □m]] 5 μm in Ra, grains loosened from the AlN due to friction between the ceramic susceptor and the wafer can grow numerous. Grain-loosened particles in that case become contaminants that have a negative effect on processes, such as film deposition and etching, on the wafer. Furthermore, then, a surface roughness of [[1 □m]] 1 μm or less in Ra is ideal.

Please replace paragraph [0075] with the following amended paragraph:

[0075] The planarity of the respective joining faces of the shaft and ceramic susceptor to be joined preferably is 0.5 mm or less. Beyond this level interstices are

liable to occur in the joining faces, impeding the production of a joint having adequate gastightness. A planarity of 0.1 mm or less is more suitable. Here, still more suitable is a planarity of the susceptor joining faces of 0.02 mm or less. Likewise, the surface roughness of the respective joining faces preferably is [[5 □m]] 5 µm or less in Ra. Surface roughness exceeding this would then also mean that interstices are liable to occur in the joining faces. A surface roughness of [[1 □m]] 1 µm or less in Ra is still more suitable.

Please replace paragraph [0080] with the following amended paragraph:

[0077] *Embodiment 1* - 99 parts by weight aluminum nitride powder and 1 part by weight Y_2O_3 powder were mixed and blended with 10 parts by weight polyvinyl butyral as a binder and 5 parts by weight dibutyl phthalate as a solvent, and doctor-bladed into green sheets 430 mm in diameter and 1.0 mm in thickness. Here, an aluminum nitride powder having a mean particle diameter of [[0.6 □m]] 0.6 µm and a specific surface area of 3.4 m^2/g was utilized. In addition, a tungsten paste was prepared with a tungsten powder of [[2.0 □m]] 2.0 µm mean particle diameter being 100 parts by weight, utilizing [[Y_2O^3]] Y_2O_3 at 1 part by weight, Al_2O_3 at 1 part by weight, 5 parts by weight ethyl cellulose, being a binder, and as a solvent, butyl Carbitol™. A pot mill and a triple-roller mill were used for mixing.

Please replace paragraph [0081] with the following amended paragraph:

[0081] This W paste was formed into the resistive-heating-element circuit pattern shown in Fig. 1 onto the green sheets by screen-printing. Specifically, approximately concentric circular resistive heating elements 2 and 3 were patterned respectively in an area to the inside of a perimeter at 70% or less of the radius from the center, and in the area lying outside that perimeter. The linewidth of resistive heating element 2 was rendered 5 mm in the center and gradually narrowed going toward the periphery,

while the linewidth of resistive heating element 3 was rendered 3 mm at the echoed periphery. The spacing between all lines was 3 mm, and the post-drying thickness was rendered [[30 □m]] <u>30 *μm*</u>. Through-holes 6 made so as to obtain electrical connection with the lead circuit were formed at the start/end points 5 of the resistive-heating-element circuit patterns. Here, the reason the linewidth of the resistive-heating-element circuits was thus gradually narrowed approaching the periphery from the center was that since a large amount of heat is given off the ceramic along the periphery, in order to compensate for this the resistive-heating-element circuit resistance there was raised by narrowing the linewidth to increase the amount of heat emitted.

Please replace paragraph [0082] with the following amended paragraph:

[0082] In addition, a lead circuit 4 represented in Fig. 2 was formed onto a separate green sheet. The linewidth of the lead circuit 4 was rendered 10 mm, and the post-drying thickness, [[40 □m]] <u>40 *μm*</u>. The start/end points 5 of the resistive-heating-element circuit patterns were electrically connected to electrodes 7 as illustrated in Fig. 3 via the above-described through-holes 6 and lead circuit 4. The electrodes 7 were formed proximate to the near center of the ceramic susceptor.

Please replace paragraph [0084] with the following amended paragraph:

[0084] After sintering, the susceptor was put through a polishing operation to bring the processed-object retaining surface to [[1 □m]] <u>1 *μm*</u> or less in Ra, and the shaft-joint surface to [[1 □m]] <u>1 *μm*</u> or less in Ra. The susceptor also underwent an operation to true its outer diameter. The outer diameter of the ceramic susceptor unit 1 following these operations was 330 mm; its thickness, 8 mm.